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19 December 1963

REPORT OF TRI-PARTITE WORKING PARTY ON

SOVIET STRATEGIC SURFACE-TO-SURFACE MISSILE DEPLOYMENT

Guided Missile and Astronautics Intelligence Committee
of the
United States Intelligence Board

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REPORT OF TRI-PARTITE WORKING PARTY ON
SOVIET STRATEGIC SURFACE-TO-SURFACE
MISSILE DEPLOYMENT

16 - 23 September 1963
Washington, D.C.

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AGENDA
TRI-PARTITE DEPLOYMENT WORKING PARTY

Washington, D.C.

16-23 September 1963

Monday A.M. (0900 - 1200)

1. Tyuratam Range
 - a. Area A1 and A2
 - b. Area B
 - c. Area C (C1 and C2) (C2 and C3)
 - d. Area D1 and D2
 - e. Area E
 - f. Area F
 - g. Area G
 - h. Area H
 - i. Weapon Association/Prototypes

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Monday P.M. (1300 - 1630) & Tuesday (0900-1200 & 1330 - 1630)

1. ICBM Deployment
 - a. Locations
 - b. Site signatures
 - c. Construction timing
 - d. Operational concepts and readiness
 - e. Refire capability
 - f. Hardening
 - g. Weapon Association

Wednesday A.M. (0900 - 1200)

1. Kapustin Yar Range
 - a. Area E
 - b. Area 2C
 - c. Area 3C
 - d. Area 4C
 - e. Area 5C
 - f. Others
 - g. Weapon Association

Wednesday P.M. (1330 - 1630) & Thursday (0900-1200 & 1330 - 1500)

1. MRBM/IRBM Deployment
 - a. Locations
 - b. Site signatures
 - c. Construction timing
 - d. Operational concepts and readiness
 - e. Refire capability
 - f. Hardening
 - g. Weapon Association

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Thursday P.M. (1500 - 1630)

1. Soviet Missiles in Cuba
 - a. Deployment
 - b. Equipment
 - c. Operational Concepts and Readiness

Friday A.M.

1. Organization and Training (0900 - 1100)
2. Deployment Indicators and Suspect Areas (1100-1200)
 - a. MRBM/IRBM
 - b. ICBM

Friday P.M.

1. Command and Control (1330-1500)
2. Standardization of Terms (Configurations and Names) (1500 - 1630)

Monday A.M. (0900 - 1200)

1. Summary and Conclusions
2. Preparation and Approval of Minutes

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SUMMARY AND CONCLUSIONS

INTERCONTINENTAL BALLISTIC MISSILE DEPLOYMENT

I. INTRODUCTION

A. General

All three delegations were in general agreement as to the number and operational status of Soviet ICBM sites currently deployed in the USSR. There were no areas of major disagreement regarding ICBM deployment although the [] delegations do not believe that the SS-8 missile is operational at the present time. Certain other problem areas exist, and these are presented in the form of unresolved questions in Par III.

B. Level of Confidence

Through extensive usable [] coverage of the Soviet rail system, all conferees have a high degree of confidence that the resultant assessment of Soviet ICBM deployment is accurate.

II. CONCLUSIONS

A. ICBM

As of [] the Soviets have deployed 95 sites (211 launchers)* at 18 ICBM complexes located generally between 50 and 60 degrees north latitude and along the Soviet rail system. Of the 211 deployed launchers thus far identified, 142 are soft and 69* are hard. About 100 launchers are currently believed to be operational, excluding the Tyuratam Test Range.

The following numbers represent an assessment of the operational status of identified Soviet ICBM sites through []

Soft Sites	43	72	72
Hard Sites*	6	15	23

B. Future Trends

The type IIC deployment program will probably be limited to those sites existing at Tyumen, Kozelsk and Plesetsk. However, a recent start of a hard site at Kozelsk (Site C), if for the SS-8, would represent the first start of its kind since about the [] and would represent continued deployment of the SS-8. Continued deployment of SS-7 in both a soft and hard configuration is in evidence.

C. Readiness/Refire/Salvo

The Soviets have at least 102 deployed launchers (excluding TTMTR) which appear to be complete as of [] from which ICBMs could be fired. It is believed that soft ICBM sites have a refire capability. The exact time to refire is undetermined, but could probably be accomplished in about 10 hours. The hard sites do not have an immediate refire capability. Although the Soviets have demonstrated multiple ICBM launchings at TTMTR, we are unable to apply this information to Salvo capability of the field force. Information on Soviet doctrine, guidance, fueling techniques, missile reliability and launch options is such that it does not permit us to assess the Soviet Salvo capability.

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D. Construction Timing

The SS-7 deployed sites (Type IIA, IIB) were constructed in about 12 to 15 months. Some Type IIC sites took as long as 18-24 months to complete, and hard sites are completed in about 2 years. Construction of the new Type IID sites will probably take on the order of one year to complete.

E. Hardening

Hardening techniques (bunkering) of buildings have been observed in recent photography at some of the deployed IIC and IID launch sites. Hard silo type launch sites for the SS-7 and probably for the SS-8 have been observed at 14 (including Tyumen) of the 18 ICBM complexes. Although studies were available on ICBM hardening, this conference did not attempt to assess the degree of hardening.

III. PROBLEM AREAS

The following questions cover problem areas where available evidence is either insufficient to permit an evaluation or further analysis of existing evidence is required.

A. Number of Launch Silos in Hardened ICBM Launch Sites and Mode of Operation

1. Background

It is the [] position that hard ICBM sites probably contain 3 launch silos. The [] delegation believes there is insufficient evidence to determine whether the 3rd silo is in fact a launch silo.

2. Questions

- a. What is the most likely function of the 3rd silo?
- b. Do the Soviets employ silo lift or do they fire directly from the launch silo?
- c. Is the missile maintained in a fueled condition in the silo, or are there underground storage facilities adjacent to the launch silos?

B. Site Orientation

Site orientation varies widely in an arc from West to East and there appears to be a uniform difference in orientation for each weapons system.

1. Questions

- a. What is the significance of the various site orientations?
- b. Can likely target areas be determined from site orientation?

C. Operational Concept

Photography has provided considerable evidence of launch control bunkers, checkout or missile ready buildings and other structures at Soviet ICBM launch sites. Many facilities present at the launch sites have not had specific function ascribed, therefore, it has not been possible to establish the internal concept of operation at the launch site.

1. Questions

- a. What is the function of the "missile ready building (s)" located at soft ICBM sites? Do both buildings serve the same function?
- b. How many missiles are kept on site, within the complex support facility, and in what readiness condition?
- c. Where is the ground support equipment kept, and how is it used in the operation?
- d. Do the Soviets use mobile ground support equipment, or have they gone to an integral system?

D. Organization

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SUMMARY AND CONCLUSIONS

MEDIUM AND INTERMEDIATE RANGE BALLISTIC MISSILE DEPLOYMENT

I. INTRODUCTION

A. General

All three delegations were in general agreement as to the number and operational status of IRBM/MRBM sites currently deployed in the USSR. Areas of disagreement involved the number of launch silos at hard IRBM/MRBM sites and the probability that all soft MRBM complexes will eventually be augmented by the addition of a hard site.

B. Level of Confidence

Evaluations of site deployment were based on photographic, [] and other collateral information with a high degree of confidence. All three delegations believe it unlikely that more than a few completed deployed sites remain unidentified. Areas in which evaluations could not be made due to lack of evidence are included in paragraph III on page 4.

II. CONCLUSIONS

A. MRBM/IRBM Site Status

1. Status as of [] A total of 190 MRBM/IRBM sites have been identified on [] photography. These sites contain a total of 678* launchers, including 82 in a hardened

*Based on two launch silos per hard site. Should MRBM/IRBM hard sites contain three launchers each the total would be 719. Should hard MRBM sites contain 4 launchers and IRBMs three, the total would read 740.

configuration. A total of 644 launchers, including 60 hard, are estimated to be operational.

2. Future Trend

All three delegations agree that the construction of soft MRBM/IRBM sites is virtually complete, but that construction of hard sites will continue into [] believes that the final deployment pattern will provide for complexes of three sites, most consisting of a mixture of hard and soft sites.

The [] delegations believe that the MRBM/IRBM program will level off by [] with a total of 700-800 launchers (considering two launchers per hard site). Further, they believe that recent photography indicates that a hard launch site will not be added to more than a few of the soft complexes.

B. Geographic Location

IRBM/MRBM complexes are deployed predominantly in the Western USSR and to a lesser extent in the Southern and Far Eastern USSR. (See GMAIC report "Evaluations of Soviet Surface-to-Surface Missile Deployment, 9th Revision," dated [] for deployment locations).

C. Site Signatures

There are two basic signatures for the soft MRBM and one for the hardened version. In the case of the IRBM, there is one basic soft and one hard configuration. With the exception of the earliest deployed MRBM sites, these component

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soft and hard configurations are observable at the Kapustin Yar Missile Test Range.

D. Construction Timing

It is generally agreed that MRBM/IRBM soft sites require 12 months under normal conditions. Earlier versions may have taken as long as 18 months. As far as hard sites are concerned, 15 to 20 months appear to be required, depending on local conditions.

E. Weapon Association

1. There is complete agreement that the SS-5 IRBM is the only weapon system deployed at existing IRBM sites, both soft and hard.

2. As far as MRBM weapons systems are concerned, all agree that the SS-4 SANDAL is the weapon system deployed on the majority, if not all, existing soft and hard MRBM sites. The SS-3 SHYSTER is obsolescent and few, if any, remain deployed.

F. Hardness

There is no direct evidence of degree of hardness of MRBM/IRBM sites. Therefore, the conferees did not address themselves to this question.

G. Operational Considerations

It was generally concluded that the observed mixture of soft and hard site configurations in both the MRBM and IRBM deployment programs provides a variety of options in the operational employment of these sites.

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2. Refire

It is agreed that soft MRBM/IRBM sites have been provided with a capability to carry out at least one additional firing from each launch pad. Hard launch sites do not have an immediate refire capability.

III. PROBLEM AREAS

The following questions cover problem areas where either available evidence is insufficient to permit an evaluation, or further analysis of existing evidence is required. In some instances, the lack of hard evidence has resulted in divergent views. In others, available information is so scant that no firm position has been taken by any of the delegations. In all cases, further evidence will be required to provide a firm basis upon which to make an evaluation.

A. Alternate/Reserve MRBM Positions

1. Background

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Recent photography has revealed the existence of a few field-type sites, but it is not known if these are, in fact, alternate or reserve positions. All but a few fixed sites thus far observed are considered to be primary sites.

2. Question

Do alternate/reserve sites exist? If so, what do they look like?

B. Number of Launch Silos in Hardened MRBM/IRBM Launch Sites and Mode of Operation.

1. Background

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[redacted] is firm in its belief that MRBM hard sites contain four, and IRBM

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hard sites contain three launch silos. [REDACTED]

[REDACTED] others believing that both contain two, possibly three, launch silos. [REDACTED]

[REDACTED] because of differences in technical analysis, reserve in their opinion pending further study. The mode of firing from silos cannot be determined at the present time.

2. Questions

a. What is the function of the third (lower left) silo at both MRBM and IRBM hard sites?

b. Is there a fourth silo at MRBM hard sites? If so, what function does it perform?

c. Where is the personnel and equipment entrance to MRBM/IRBM hard sites located?

d. Do the Soviets employ silo lift or fire directly from the launch silo?

C. Organization

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D. Site Orientation

1. Background

Site orientation appears to be uniform for each weapons system, and it is believed that a directional relationship exists between site orientation and target areas.

2. Question

a. Is site orientation indicative to primary targets?

b. What are the limits of the primary arc of fire?

E. Salvo Fire

1. Background

All sites have a theoretical capability to salvo fire. However, it is not known whether the weapons systems involved have inherent restrictive factors preventing the simultaneous firing of more than one or two missiles from each site.

2. Question

What is the Soviet capability for salvo fire from MRBM/IRBM sites?

F. Manning of Soft MRBM Sites

1. Background

The operational manning of all soft MRBM sites would require personnel levels which appear to be inconsistent with current estimates of SRF overall strength. On the other hand, all but a few such sites appear to represent primary positions.

2. Questions

a. How many of the soft MRBM sites are operationally manned?

b. If all are not currently manned, which ones are not, and in what manner, and over what time period will they be manned in the event of an emergency?

c. What is the overall strength of the SRF?

G. Unusual Site Configurations

1. Background

Five isolated and unusually configured soft MRBM/IRBM soft sites have been identified. None have support facilities in the immediate vicinity.

2. Question

What is the function of these sites?

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SUMMARY AND CONCLUSIONS

SOVIET ROCKET FORCE ORGANIZATION AND TRAINING

I. ORGANIZATION

The strategic rocket forces are responsible for operational ICBM, IRBM and MRBM systems as well as the test ranges at Kapustin Yar and Tyuratam. The planned number of SS-7 launchers to a division may be as many as sixteen, although twenty-two (excluding possible hard site Kat Yurya) launchers have been identified at one complex. In the case of both systems, combinations of hard and soft sites are to be found within a division. IRBM and MRBM divisions are believed to consist of at least three regiments, the battalions of which are deployed in various combinations of hard and soft sites. The foregoing is based mainly on photographic evidence. From this source it has only been possible to deduce a skeleton structure at regimental level, and little is therefore known of the detailed organization.

II. TRAINING

Very little progress has been made in the past year in determining the level of training in the strategic rocket forces. Although the speed and facility with which SANDAL missiles were deployed in Cuba gave a good indication of the state of training of the forces engaged in this operation, it is not possible to determine from available intelligence the number of trained crews available for the weapons systems in the strategic rocket forces.

III. PROBLEM AREAS

a. What is the current operational strength of the SRF and how is manpower allocated between the various weapons systems?

b. What can be done to improve collection of intelligence on the state of training and the detailed organization down to battalion level of the various components of the SRF?

SUMMARY AND CONCLUSIONS

SOVIET ROCKET FORCE COMMAND AND CONTROL

I. GENERAL

There was complete agreement among the delegations on the command and control system for the deployed strategic missile complexes. There is believed to be an operational chain of command from Khrushchev, acting as Commander-in-Chief of the Supreme High Command down thru the General Staff of the Ministry of Defense to the Commander of the Strategic Rocket Forces, and then directly to the deployed complexes.

We have not definitely seen command and control of strategic missile units in [] since the Far East Long Range Air Army Command post exercises in []

[] however, we have noted a radio network which is believed to serve the Strategic Rocket Forces, but to date, insufficient evidence exists to allow us to label it definitely as a command and control network (see Annex).

It is expected that landline, microwave and MERCURY GRASS normally constitute the primary means of communications in command and control system, but high-frequency radio will provide back-up.

II. PROBLEM AREAS

What is the function of the radio network mentioned above and what other communication facilities are available for use by the SRF?

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ANNEX 1 - SOVIET ICBM DEPLOYMENT

GENERAL

25X1 Through extensive usable [] cov-
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 to about 90 percent since [], a total
 of 18 deployed ICBM complexes have now been
 identified, with a total of confirmed launchers of
 three basic configurations in various stages of
 construction. (See Figure 1) About 100 of the
 confirmed launchers both soft and hard, are
 currently believed to be operational excluding the
 Tyuratam Test Range. The number of con-
 25X1 firmed launchers by type and operational status*
 as of [] are as follows:

Table 1
 Estimated Status of Confirmed* ICBM Launchers
 at Deployed Complexes

TYPE	SITES	LAUNCHERS	LAUNCHERS COMPLETED	U/C
I	3	4	4	0
II A	5	10	10	0
II B	29	58	58	0
II C	8	16	4	12
II D	27	54	8	46
III A**	19	57	18	39
III B**	4	12	0	12
TOTAL***	95	211	102	109

*Does not include possible sites at:

Omsk - Launch Site B

Yurya - Launch Site K

25X1 **Considering Type III Sites as having 3 launch silos. It is
 25X1 [] that type III sites probably have 3
 launch silos; however, [] feels that
 there is insufficient evidence to determine whether the 3rd
 silo is in fact a launch silo.

***Figures exclude R&D and prototype launchers at the
 Tyuratam Missile Test Range (TTMTR).

The following table represents our estimate
 of the cumulative number of observed launch-
 ers that will be completed and probably op-
 erational by Quarter:

Table 2.

1st Qtr	2nd Qtr	3rd Qtr	4th Qtr
---	---	102	141
176	188	193	199
208	211	---	---

I. TEST RANGE FACILITIES RELATED TO DEPLOYMENT

A. TTMTR Launch Facilities

Soviet requirements for the concurrent test-
 ing of three different ICBM systems, space ve-
 hicles, as well as the introduction of hard sites
 has caused an extensive expansion of Tyuratam
 launching facilities from the original, single
 launch pad to a present total of 14-18 completed
 launchers with associated ground support equip-
 ment. Much detailed information on the chron-
 ology of test range expansion and the nature of
 range facilities is known from repeated []
 [] photographic coverage, supple-
 mented by other technical and clandestine col-
 lection means. Based on the general character-
 istics of the ICBM systems, the firingschedules
 and telemetry usage at the range head and the
 missile and space tracking reports passed by
 Soviet radars downrange, the probable relation
 of launch areas at Tyuratam with the ICBM
 programs follows.

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Launch Complex A: The original, massive, rail-served A-1 launcher with pit has been used for all R&D firings of SS-6 missiles and most space boosters. An adjacent, smaller, flat pad A-2 has also been available since [REDACTED]. The launcher consists of a concrete pad approximately 150 feet square. Two small structures are located adjacent to the pad, one on each side. The separation distance between the two structures is about 165 feet or slightly greater than the pad width. The rail served facility at A-2 has several distinct similarities to Launch Area E and probably was used to launch the SS-8 missile [REDACTED] and the first 5 months [REDACTED].

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In addition to its function as R&D launch area for the SS-6 and SS-8 missiles, Launch Complex A serves as the space facility at Tyuratam.

Launch Complex B: This is a large, rail-served launcher, similar to the original at Launch Area A. The area was first observed under construction in [REDACTED] was ready for operational use by [REDACTED] and may have been operational as early as [REDACTED]. Additional facilities were added between [REDACTED] [REDACTED] notably at the launch support site. Several SS-6 missiles have been reliably backtracked to Launch Complex B and these facilities probably have been used for troop training and quality control firing of the operational SS-6 missile system. Two new large buildings are being added to the complex [REDACTED].

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Launch Complex C: At the present time this Launch Complex has three launch pads and an associated support facility. It has, however, undergone two modifications since completion of the original launch facilities and has been used for research, development, production quality control and troop training firings for the SS-7 missile system. Since [REDACTED] a total of nineteen SS-7 missiles have been reliably

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backtracked to Launch Complex C. In [REDACTED] the launch area was first observed in an early stage of construction. [REDACTED] it was almost complete, and probably became operational shortly thereafter. At this time it had two road served launch pads within a secured launch site, and an extensive support facility with rail and road service.

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In late [REDACTED] the launch complex was observed in the process of expansion. Construction of a third launch pad was initiated after [REDACTED] and probably was complete by the [REDACTED]. This new launch pad, C-3, was added about 900 feet east of C-2 and had the same alignment. A new access road had been built from the main road, and ran midway between C-2 and C-3.

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The second modification of the C area included the addition of canted structures at launch pad, C-2. These structures have been observed at a new type of deployment system (II D) in the field; however, their specific function is not known. It has been suggested that these structures may serve as propellant storage. This new construction phase was initiated in [REDACTED] and completed in the first [REDACTED].

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Launch Complex D: This launch complex consists of two road served hard launch facilities, each containing three silos. It is the [REDACTED] that it is more likely that all 3 silos are launch silos. [REDACTED] feels that there is insufficient evidence to determine whether there is in fact a third launch silo. Although initial traces of construction activity at D-1 were present in the photography of [REDACTED] the area was first identified in [REDACTED]. Construction of the facility was definitely complete by [REDACTED] when two missile firings were backtracked to this launch area. However, the facility may have been operational as early as [REDACTED] [REDACTED] indicated only a small amount of

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external finishing work was required from the D Launch Complex. Construction at D-2 was initiated in late [] or about one year later than D-1, and it will probably become operational late in the third quarter or the fourth quarter []

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Launch Area D-1 became operational too late to play a part in the initial R&D test phase of the SS-7 ICBM. It probably was used for R&D of the missile for the hard configuration as well as troop training and quality control tests. In [] there was an attempt to fire three SS-7 missiles at 5 minute intervals. These may have been simulated operational firings from a single launch facility and could have been a test of the launch facility at D-1.

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Launch Complex E: This area has 3 soft launchers within the launch site. Two of these launchers are identical, and were constructed concurrently. The third, E-3, was started considerably later but has the same basic features of E-1 and E-2. Similar features include the size and spacing of three structures surrounding the pad, and an unusual rail connection from the missile ready building to the launch pad. However, at E-3 the structures are mounded and the road pattern is slightly different. Two probable pylons approximately 150 feet high are located at each pad area. The entire area is road served and has only a very small support site, and is not connected to the main complex rail system. Construction of Launch Complex E began in the third quarter [] and two launchers became operational in []. Launcher E-3 started construction in [] and probably was complete by the end []. The distinct similarities between A-2, Launch Area E and the sites observed in the field indicate they are related to the same missile system. Two SS-8 missiles have been backtracked to the E area. Because of these factors we believe that area E is the soft prototype launch site for the SS-8.

Launch Complex F: This launch site designated Type III B, is a hard facility with three silos. Construction started about [] and the facility should have reached operational status by []. At F there is a heart-shaped road pattern about 1,200' across, and along the north edge of the area are three silos in a line. The silos are spaced 180 feet between center and a control bunker about 240 feet from the line of silos.

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This facility is different in configuration from the hard sites at the D area. Deployed sites resembling this prototype have been found at two complexes in the field. At one complex, Kozelsk, it is found with launch areas similar to Area E at TTMTR. Therefore, we believe Launch Complex F may be the hard operational prototype for the SS-8 missile.

Launch Complex G: In [] the Soviets had begun building a road and a rail line out towards an area NW of Launch Area F. This area now incorporates several secured areas under construction and a large support area. Two rail served launch areas are currently under construction and the first may be ready to launch missiles as early as the fourth quarter of []. The evidence indicates that this is a facility for a new system; however, there is insufficient evidence to determine whether this is for a new ICBM, or a follow on space system, or both. No deployed facilities of a similar configuration have been identified.

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Launch Complex H: This facility is a launch area identified in [] in an early stage of construction and probably started in []. Located 1.8 miles east of Launch Complex C, it is a partially secured area containing at least 12 buildings, a possible bunker, one shallow irregular excavation and two smaller rectangular excavations. The installation is rail and road served, the rail being an extension of the spur next to the assembly and checkout build-

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ing at the support site of Launch Complex C. The area was last observed in [redacted] The purpose of this facility is unknown. Two additional areas, one between launch area A and E, one between launch area A and B are in early stage of construction.

B. Relation Between Facilities at TTMTR and Operational Complexes

The configuration and utilization of test range facilities at Tyuratam provide a key to recognition of deployment in the field. The testing of ICBM systems at Tyuratam involves, not only R&D on the missile itself, but also the development and proving out of compatible ground support equipment for use in deployment complexes and, later, quality control and operational training firings. From the chronology of the ICBM programs, it appears that Soviet practice is to develop missiles and ground support equipment concurrently as a complete weapon system. We believe that field support equipment is somewhat less complex than corresponding R&D equipment, and the differences between the SS-6 launch facilities at Tyuratam Areas A and B, and the SS-7 facilities at the original C-1 and C-3 installations provide support for this belief.

The program for each of the launch site configurations associated with each missile system has followed a discernible pattern involving test range and field activity overlapping in time. In the case of the SS-7, construction activity had commenced at a number of locations in the field before the first test firing of the missile at TTMTR. To date, all confirmed ICBM launch sites in the field are recognizable outgrowths of prototype facilities at TTMTR.

II. DEPLOYED ICBM WEAPONS SYSTEMS

A. SS-6 ICBM Deployment System

1. Soft Sites

At Plesetsk we have identified four large, soft launchers, each served directly by

rail from missile ready buildings and a central support area. Their rail service, close similarity to the launcher at Tyuratam Complex B, and evidence that construction was in progress [redacted] confirms that these launchers are for the first generation, SS-6 ICBM system. They have probably been operational [redacted] and the latest photography, [redacted] indicates the sites are still active.

Plesetsk is the only deployment complex at which launchers of this type have been identified. The operational SS-6 deployment configuration and its resemblance to the test range facilities are clearly recognizable in good quality, cloud-free [redacted] photography. Photography of this quality has been accumulated on over 95 percent of all rail lines in the best suited regions of the USSR [redacted] Therefore, we believe that SS-6 deployment exists only at Plesetsk.

2. Special Role of Plesetsk

The Plesetsk ICBM Launch Complex has held a special position in the Soviet missile program since the beginning of the deployment program for long range strategic missiles. It was selected as one of the sites for the deployment of the first Soviet ICBM, the SS-6. When further deployment of the SS-6 was cancelled or cut back, Plesetsk remained as the only SS-6 deployment location.

As new deployment systems came into being they were also deployed at Plesetsk. With the introduction of soft SS-7 sites it became apparent that Plesetsk performed a special role in the missile program, perhaps an operational training facility. Although the Soviets constructed both R&D and operational prototype launch facilities at the Tyuratam Test Range, it is quite possible they had an additional requirement for a field operational orientation and training of SRF troops, or for deployment system refinement under more realistic conditions than

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existed at Tyuratam. Whatever its mission, Plesetsk occupied a unique position in the missile deployment program. This special role may have changed or come to a halt late in []

[] Neither the hard III B or latest II D soft configuration has made its appearance at Plesetsk. No new construction activity is currently apparent at Plesetsk, nor does there appear to be any effort to modify any of the existing launch areas.

Although the evidence suggests the training role of Plesetsk has changed, the complex has maintained its operational role. Possibly the Soviets concluded that the training facilities at Tyuratam were sufficient for their current needs and that continuation or expansion of the training role would have seriously hampered its function as an operational launch complex.

B. SS-7 ICBM Deployment System

The SS-7 ICBM system is being deployed at fifteen field locations in the USSR and Plesetsk. One of the field locations, Gladkaya, where two soft launch areas were identified under construction [] was converted to the SS-7 system in []

Although each complex contains a number of variations, an SS-7 complex typically consists of three basic elements; a complex support base, a rail-to-road transfer point and a number of launch areas. The launch areas include the launch site, the technical site, and a housing facility. The SS-7 is being deployed in launch sites of both a hard and a soft configuration, but there has been no apparent attempt to harden either the technical site or the housing facility. The soft launch sites contain two launch positions and the hard sites contain at least two, and probably three, launch positions. Of the fifteen confirmed locations of SS-7 deployment, four contain only soft sites, two only hard sites and nine contain both.

1. Physical Description of ICBM Launch

Sites

a. Soft Type II Sites

Each soft launch site occupies from 85 to 116 acres, and is enclosed by a double security fence. It contains two elongated launch pads, (approximately 1,000 feet apart), missile ready buildings, 2 to 4 major structures in the central area, an unidentified structure adjacent to each pad and several smaller buildings. Guidance and alignment equipment, handling and fueling facilities, and a control bunker are probably within this area; a second missile for each launcher may also be available in the area. Evidence at some sites suggests that facilities may be located below the pad level. A road branches from the main service road and leads to the operations area of the launch site and links the two pads with other directly associated facilities. Soft sites have appeared in the field in three deployment modes, A, B, and D, which reflect sequential modifications in the SS-7 system. A fourth variant C appears to be intended for the SS-8.

(1) Mode A

These sites represent the earliest deployment mode for the SS-7. Only five of these sites have been identified. Yurya A and B, Plesetsk A and Verkhnya Salda B and C. At these sites, the two missile-ready buildings (approximately 170 by 105 feet) are parallel and are situated on a concrete apron along the center road.

(2) Mode B

The principal difference apparent between Mode A and Mode B sites appears to be the positioning of the two missile-ready buildings. At Mode B sites these buildings are located directly to the rear of the launch pads and are a drive in type. In most instances where the stage of construction and quality of photography has permitted measurement, these buildings are 170 by 125 feet and 170 by 105

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feet, with the wider of the two buildings canted 25 to 35 degrees from the long axis of the pads.

(3) Mode C

Sites described as Type IIC exist at three known locations within the Soviet Union, Plesetsk, Kozelsk, and Tyumen. In addition an ICBM complex with two soft launch areas of this type was begun in [redacted] Gladkaya near Krasnoyarsk, but was later converted to the IID site assessed for the SS-7. The total number of launchers at the IIC site identified to date in the field, not including the cancelled sites at Gladkaya, is 16 soft.

The soft site is a fenced rectangle generally about 1800' by 1700' containing a loop road pattern, two launch pads with fixed equipment, two missile ready buildings and some additional structures. The sites can be distinguished from soft SS-7 sites by several major differences as follows: the orientation differs from SS-7 sites; pad separation is about 800' as compared to 950'; there is a ready building lined up to the rear of each pad; the direct connection between the ready building and pad does not appear to be a finished road as to SS-7 sites but may be a railway of about 800'; and finally an interferometer with 1,200 foot legs serves each launch site. In addition, there is a small triad or plus configuration, about 300' wide, to the rear of the launch site. We do not know the function of this facility.

(4) Mode D

Mode D launch sites represent the most recent modification for deployment of the SS-7 in a soft mode. A few of these sites are considered complete and while similar in general configuration to Mode A and B, appear to have the following differences: there are two canted structures, 30 x 90 feet, located inboard of each launch pad; there are two structures along the center access road; and there is a larger pad area. A definite pattern has not emerged as to the number and arrangement of missile ready

buildings at Mode D sites; however, it is apparent these buildings will differ in size and number from those found at the older sites. The pattern varies from three buildings behind one pad, to one building behind each pad, to two buildings behind one pad and one building behind the other. Although dimensions of the buildings vary, in most cases the individual buildings are smaller than at the Mode A and B sites. In addition, a group of three buildings, perhaps with a special function, has been consistently identified to the rear of the launch site. While the road at Mode A and B sites forms a loop pattern in the forward area at Mode D sites, the forward road is absent and turn around is allowed only by the enlarged pad.

b. Hard Type III-A Sites

The average size of the secured area at the hard launch sites is 1,600 by 1,400 feet. When completed, these sites are characterized by an oval road pattern, approximately 850-890 feet long and 360 feet wide, surrounding three identical silo covers, approximately 80 by 40 feet, and a mounded control bunker. A probable spray pond is located outside the oval road pattern to the rear and left of the control bunker.

When the site is in a mid-stage of construction, it is characterized by a rectangular excavation 500 to 600 feet long and 150 to 200 feet wide, with a notch about 200 by 150 feet nearly centered along one side. The excavation contains three silos in a straight line separated by approximately 180 feet on center. The excavation also contains two rectangular equipment and/or fuel bunkers, 70 by 50 feet, between the silos. The notched portion of the excavation to the rear of the silos contains the control bunker which appears to be a concrete structure about 100 by 120 feet. Two probable buried tanks have been identified outside of, and to the side of the excavation.

Although three silos have been identified

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in the excavation, the arrangement of the two equipment bunkers, the appearance of one silo as larger than the others on some coverages, and the indistinct appearance of one silo have raised the possibility that one of the three silos is not a launch silo. However, the spacing of the three structures and the identical appearance and dimensions of the silo covers after the excavation has been backfilled provide strong indications that all three probably are launch silos. [] there may be only two launch silos.

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c. Hard Type III-B Sites

The most advanced deployed hard site, not yet complete, is secured by a single security fence and covers an area about 2,000' x 1,400'. The site is road-served, and although a finished road pattern is not yet evident, a cardioid pattern is suggested. The site contains three probable launch silos similar in appearance, with an inside diameter of 30' and about 160' apart. The control bunker is centered to the rear of the silos and is 80' by 120'. One hundred feet in front of the three silos, there is one and probably two equipment bunkers measuring 25' x 130'. When backfilled, they appear as a single bunker 85' x 140'. A possible spray pond, 100' x 135', is to the left of the equipment bunkers. A triad structure, similar to the "plus" configuration at the soft sites, is situated 4,200' to the rear of the launch site. Its purpose is not known, but it probably has the same function as the triads at the soft sites.

Hard sites have both similarities and differences to Areas D and F at TTMTR. The launch silo separation appears consistent with that at both D and F, however, the location of equipment and control bunkers, the spray pond location, the road pattern, and the overall orientation resemble Complex F rather than D, indicating that F may be the hard prototype for the SS-8.

d. Complex Support Facilities associated with Type II C Sites

The complex support facility at these complexes are very similar to the support facilities associated with SS-7 complexes. It is one of the first identifiable features of a launch complex, and during the construction stage, serves as a base for building supplies and material for the rest of the complex. After the construction phase, it serves as a logistic and maintenance center for the entire complex. These complex support facilities are similar in size and developmental pattern to the present SS-7 complex support facilities and suggest that they were originally designed to support an equivalent number of launch areas.

A separate railroad transfer point is also present and is probably used to transfer missiles and propellants from rail-to-road. It differs from the transfer point seen at most complexes in that each contains an extra spur at the same relative position branching at the same angle.

2. Assignment of SS-8 to Type II C Launch Sites

The principal basis for the assignment of the SS-8 to these configurations stems from the activities and physical arrangement of Tyuratam and our ability to relate features at Tyuratam to systems noted in the field.

Trajectory backtrack has established with a high probability that SS-6 missiles are launched from Area A or B, and SS-7 missiles are launched from Area C and D, and that SS-8 missiles are launched from Area A and E.

The physical arrangement of these facilities and the timing of their construction parallels this grouping. Areas A and B were the first completed and are centrally located. Areas C and D are located to the east and use a common support facility. Their construction timing followed that of Areas A-1 and B. Areas A-2, E

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and F which run to the west also followed A-1 and B in time and were completed in that order. The completion date of A-2 is consistent with the early testing of the SS-8 and the backtrack data of that period. The first backtrack to Area E coincides with the photographic evidence of site completion in [] The strong relationship between the SS-6 and the SS-8, stemming from their common design heritage, is consistent with the use of Complex A support facilities in the test program for the SS-8, and explains the construction of pad A-2 and the placement of E with its transport connections to the Complex A support area.

The physical characteristics of the deployed Type II C sites and a few hard sites are consistent with launch Complexes E and F and show major differences from all other areas at Tyuratam. All remaining configurations in the field, equate to facilities at B, C and D at Tyuratam.

Considering the physical and geographic relationships at Tyuratam, the similarities with deployed systems, established Soviet practice in other missile systems, backtrack data, and the lack of any reasonable alternative, we believe that the SS-8 missile system is intended for Type II C and III B sites.

3. Support Facilities at ICBM Complexes

a. Complex Support Base

The complex support base is one of the first identifiable (although not unique) features of a launch complex. During the construction stage, it serves as a base for building material for the complex and then serves as a logistic and maintenance center for operational units. A typical base has 3 to 4 rail spurs, and all weather roads. However, the absence of wide radius turns and its location indicates that it is not a weapons handling area. A large area of barracks, family-type housing and administrative-type buildings is also associated with the

complex support base and provides quarters and facilities for officers, troops and dependents. Its location varies from about 1 1/2 to 21 nm from the nearest town and does not appear to be affected by security factors, since some of these bases are very near large cities and main highways.

b. Missile Transfer Point

A reasonably consistent road and rail pattern is evident in this facility at all SS-7 complexes. An improved road enters from the launch areas, parallels the rail spurs and forms a turn-around before joining the main road in a wide radius turn. The equipment for transfer from rail-to-road has not been identified at the operational launch complexes; however, some detail is available on Launch Area C at Tyuratam. A spur terminates at an L-shaped projection of a loading dock which is about []

[] This secure installation probably is used to transfer missiles and propellants from rail equipment to road equipment. Warheads also may be transferred in this area. Its simplicity indicates that no additional functions are involved.

4. Timing of Confirmed Complexes

a. Construction Cycle

(1) Soft Type II Sites

Our estimates of the timing of construction of launch sites are based on a very large number of repeated photographic observations of confirmed sites and we believe that such estimates for the hard and soft SS-7 systems are highly reliable within 1 or at the most 2 months. To date, 69 soft launch sites containing 138 launchers have been identified in various stages of construction at deployed complexes. Some 80 of these launchers are currently believed to be operational. We have estimated that construction of these sites required between 12 and 15 months. A later con-

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figuration (II-D) is estimated to take on the order of twelve months.

(2) Hard Type III Sites

To date, 19 hard SS-7 launch sites have been identified in various stages of construction at deployed complexes. Five of these appeared to be complete and probably operational by [REDACTED]. The currently identified road-served launch site for this system contains hard underground facilities, including at least two and probably three launch positions, of a silo type. Construction of a typical type III launch site takes between 21-24 months from the beginning of construction to the completion of installation of equipment.

C. Suspect ICBM Deployment Areas

There are a number of locations within the USSR that are or have been suspect ICBM deployment sites. These locations have been identified through [REDACTED] occurrences of FPN numbers from groups associated with the Strategic Rocket Forces, the scheduling of SRF associated air flights to these locations, the apparent location of a possible SRF communication link terminus in the general area, and the appearance in photography of U/I construction and/or rail spurs of a suspicious nature.

Many of the locations with some of these deployment indicators have been negated by photographic coverage of the area. The presence of the indicator remains unresolved in some of

these instances. However, current estimates of the Soviet deployment program indicate that there may be 1-2 additional SS-7 complexes still undiscovered. An examination of all available evidence indicated two areas as the most likely suspect locations for ICBM deployment. These indicators, however, do not permit us to identify the possible missile system at these suspect locations.

We have reexamined the possibility that there are SS-6 deployment complexes still unidentified in the USSR. However, locations with missile indicators during the time of SS-6 deployment have largely been negated by photographic evidence since that time. This factor, plus the obvious cancellation of the SS-6 deployment program, makes it very unlikely that there are unidentified SS-6 complexes in the USSR.

Saransk - Kovylikino Area

Suspect Missile FPN's

FPN 01425, [REDACTED]

FPN 34096-2V, [REDACTED]

FPN 41706-B, [REDACTED]

This area cannot be negated by photography for the time period of the [REDACTED]. On [REDACTED] a suspect rail spur was noted east of Kovylikino. The area has not been observed on cloud-free photography.

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ANNEX 2 - SOVIET MRBM/IRBM DEPLOYMENT

I. TEST RANGE FACILITIES RELATED TO DEPLOYMENT

A. Kapustin Yar Launch Facilities

Complex C in the southern portion of the rangehead is positively associated with the development of the MRBM/IRBM weapons systems of the Soviet Strategic Rocket Forces, as well as with space launchings. Complexes A and B are probably associated now only with shorter range missile systems, although it has been suggested that the two "hump" structures in complex A may have been utilized in the early development of a hard launch configuration.

B. Launch Complex C

This complex consists of five launch areas. When first seen in [] this area comprised the two launch sites now known as Sites 1C and 3C. In [] a third site, 2C, of two launch pads was noted. This area was at that time under construction and had probably not been brought into use. []

[] a completely new launch site, 4C, was observed in about the mid-stage of construction. [] it was estimated that the site was in the late to final stage of construction. On the same date that 4C was first seen, 5C was also noted although it was not until the later cover [] that it was recognized that there were two separate launch sites.

1. Launch Area 1C is the only rail served launch area on the range and is probably being utilized for the launch of space vehicles.

2. Launch Area 2C is associated with R&D firings of the SS-5.

3. Launch Area 3C can be associated with the development of MRBM weapons systems.

4. Launch Area 4C consists of two hardened launch facilities. The southern facility (4C2) is for IRBMs, while to the north, 4C1 is for the MRBMs. These sites are similar

to those operationally deployed and are utilized for unit training. They may also have a limited R&D function, since no other hardened facilities have been identified on the range.

5. Launch Area 5C consists of two soft launch facilities. The northern facility, 5C1, is associated with the IRBM system, while 5C2 to the south is linked to MRBMs. Both these facilities are utilized for unit training.

II. MRBM/IRBM DEPLOYMENT

A. MRBM

1. General: MRBMs are deployed in both a hard and soft configuration. While these sites are compatible with both the SS-3 and SS-4 systems, the SS-3 is now obsolescent and few, if any, remain deployed.

2. Complex Description: MRBM complexes consist of up to three launch sites, usually a mixture of one hard and two soft, the majority of which have their own support facility. A few sites have a common support area. While some complexes contain only soft sites, none containing only hard sites have been identified.

3. Site Description: (See appendix A for detailed explanation and typing of site configurations)

a. Soft sites: While there is a variety of configurations at deployed sites, all have four launch pads. Early versions usually have two missile ready buildings, while sites of more recent vintage have a ready building for each launch pad. Most of these

[] the consensus of opinion that all but a few of these confirmed sites are primary. However, it is possible that all are not fully manned. The view was expressed that a number of the sites might be manned by

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[REDACTED]

cadre strength units which maintain equipment and facilities and form the nucleus for expansion to operational strength when directed. Documentary and other evidence indicates that deployment to field-type alternate sites is a part of Soviet operational doctrine. Furthermore, evidence from Cuba shows a capability for this type of deployment. Recent photography has revealed the existence of a few field-type sites, but it is not known if these are, in fact, alternate or reserve positions.

b. Hard sites: MRBM hard sites contain a number of silos arranged in a H configuration around an underground control bunker. [REDACTED] is firm in its analysis that these sites contain four identical launch silos. There are differences of opinion within the [REDACTED] some support the [REDACTED] others believe that there are two confirmed launch silos with a possibility of a third. [REDACTED] because of differences in technical analysis, reserve in their opinion pending further study. Most hard sites are connected by an access road to an off-site support facility. The extent of this facility is not known. It is possible that the hard site relies to some degree on the support installations at or near the two soft sites within the complex. This is particularly

[REDACTED] such facility has been identified at any MRBM installation.

c. Status of Deployment: See appendix B.

B. IRBM

1. General: IRBM's are deployed at both soft and hard configurations. The SS-5 is the only IRBM currently deployed.

2. Complex Description: IRBM complexes consist of up to three launch sites. Each

complex has its own support facility. While the majority of complexes contain both hard and soft sites, three have been identified which consist of three hard sites only.

3. Site Description: (See appendix A for detailed explanation and typing of site configurations).

a. Soft sites: Only one basic type of soft IRBM site has been identified. It consists of four elongated launch pads, arranged in-line and characterized by a wider pad separation than is present at MRBM sites. Each launch pad has an associated missile ready building and a fifth building of similar size, centrally disposed among the other four. All of these sites are considered primary. [REDACTED]

b. Hard sites: IRBM hard sites contain three silos arranged in an L pattern around a central control bunker. [REDACTED] and part of the [REDACTED] believe that all three silos have an identical launch function. Other [REDACTED] are uncertain as to the function of the third silo, since in their view photographic evidence appears to show differences from the other two during the construction stage. [REDACTED] because of differences in technical analysis, reserves in their opinion pending further study. Support facilities for IRBM hard sites are not yet clearly defined. [REDACTED]

C. MRBM/IRBM Construction Timing:

1. IRBM/MRBM Soft Sites

a. Launch sites are almost invariably located in wooded areas requiring a fair amount of logging and clearing operations before construction work proper can begin. Adequate sources of construction material i.e. sand, gravel, timber are usually locally available.

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Considerable use is made of preformed concrete sections prefabricated off-site (as seen in construction of Cuban sites).

b. For access purposes, new roads have been added and, where possible, existing roads have been improved. In a number of cases new rail sidings appear to have been built to facilitate the delivery of construction materials and equipment, otherwise existing sidings have been enlarged.

c. Estimate of Site Construction Time

(1) Although hard evidence on the length of time required by the Soviets to construct a soft site in the USSR is not available, interpretation of a limited amount of sequential, photography provides a fair bases for the following estimate:

Early Stage

Logging, clearing and marking out; provision of access road and construction camp; delivery of construction material for foundations, etc.

Mid Stage

Concreting of internal roads, launchers and aprons, construction of buildings, bunkers, security fence, etc.

Late to Complete Stage

Provision of permanent plant, generators, wiring fuel storage, etc.

(2) Soft MRBM/IRBM sites generally have required a construction period of from 12-18 months. Currently the lesser period generally applies, except where local conditions are unfavorable. The upper limit is more applicable to earlier site construction, before adequate experience was garnered by construction personnel.

(3) Based on Soviet Cuban deployment, it is estimated that the Soviets can occupy a field type MRBM position and attain an IOC in approximately 24 hours or less. As far as the

IRBM is concerned, a period of approximately three months would have been required to complete the type of sites observed in Cuba. However, there is tenuous evidence that an earlier emergency firing capability might have been possible had the Soviets so desired.

2. IRBM/MRBM Hard Sites

a. Sequential photography of the various stages of hard site construction is available to a greater extent than is the case with soft sites. We are therefore able to postulate a time scale for their construction with a greater degree of certainty.

b. As in the case of the soft sites they are located, whenever possible, in heavily wooded areas and require initial clearance, provision of adequate access, delivery of building materials and plant etc., before construction can begin.

c. Broadly, we believe the time required to construct a hard site is at least 15 months, but that in certain areas, due to climatic and terrain difficulties, a period up to 20 months is necessary.

d. The construction time scale, we believe, is as follows:

Early Stage

Area cleared of vegetation; levels established; earth moving equipment moved to site. Accommodations for construction personnel built. Excavation starts; access roads constructed or improved. Construction starts on off-site support facility.

Mid Stage

Excavations completed and construction of facilities starts in excavated area. Control bunker and silos appear. Progress continues on off-site support facility. Site secured.

Late to Complete State

Construction work in excavated area completed. Area back filled and control bunker mounded

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over. Installation of launch equipment completed. Site area landscaped. Off-site support facility completed.

e. Due to deficiencies in our present

understanding of the operational requirements of a hard site, it is quite possible that although a site is assessed as complete, this may apply only to its external appearance.

APPENDIX A - SITE CONFIGURATIONS

US Designation	Description
I	Four round launch pads, in-line or offset in-line-no direct access from Ready Missile Buildings (RMBs) - two drive-through-to pads. (MRBM)
I	Four round launch pads, in-line, direct access from RMBs - four drive-through - to pads. (MRBM)
II	Four elongated launch pads, in-line, direct access from RMBs - usually four non-drive-through - to pads. (MRBM)
III	Four elongated launch pads, in-line, direct access from RMBs - usually five non-drive-through, four behind the pads with the fifth positioned centrally in the launch area - wider pad separation than the A3 configuration. (IRBM)
I	Four round launch pads in rectangular formation, usually only two RMBs - drive-through-each serving one pair of pads. (MRBM)
I	Four round launch pads in dumbbell formation, usually only two RMBs - drive-through-each serving one pair or pads. (MRBM)
I	Four round or elliptical launch pads in irregular formation, usually only two RMBs - drive-through-in launch area. (MRBM)
IV	A hard launch site near an existing complex of soft MRBM launch sites, similar in appearance to Launch Site 4C1 at Kapustin Yar.
IV	A hard launch site near an existing soft IRBM launch site, or one of those forming a complex of three hard launch sites, similar in appearance to Launch Site 4C2 at Kapustin Yar.

APPENDIX B - MRBM/IRBM STATUS

TYPE	NO. SITES	NO. LAUNCHERS	NO. LAUNCHERS COMPLETED	NO. LAUNCHERS U/C
Soft	149	596	584	12
Hard	41	82	60	22
TOTAL	190	678*	644	34

*Should hard MR/IR sites contain 3 launchers each the total would read 719. Should hard MRBM sites contain 4 launchers and IRBM sites three launchers the total would be 740.

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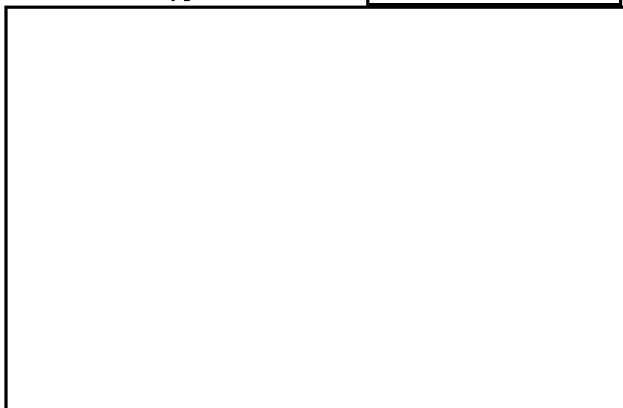
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ANNEX 3 - SOVIET ROCKET FORCES ORGANIZATION AND TRAINING

I. THE ORGANIZATION OF SRF FORMATIONS

A. The SRF has separate chains of command for its deployed ICBM and IR/MRBM weapon systems. The only complex which has a mixture of ICBM systems is Plesetsk and it is also the only location where the SS-6 is deployed. Soft launchers are deployed in pairs to form a site. It is believed that most complexes will contain a division of about 15-18 launchers although two of the older complexes already have more than this number. Locations of suspected SS-8 deployment do not as yet appear to involve as many launchers as those where the SS-7 is deployed. Both hard and soft sites are found within SS-7 and SS-8 deployment areas.

B. At Annexes "A" and "B" are the various regimental organizations as indicated by the photographic evidence. It is only in the IR/MRBM organization that there is good evidence of a divisional type structure.

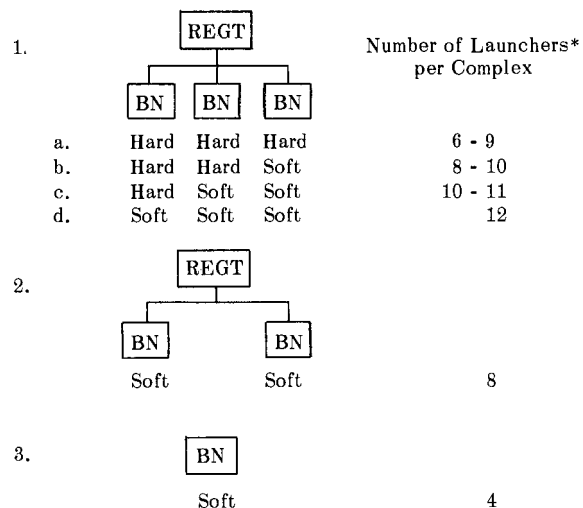


II. TRAINING

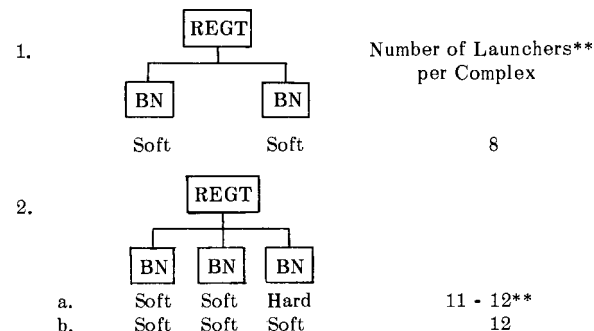
Very little progress has been made in the past year in determining the level of training in the strategic rocket forces. Although the speed and facility with which SANDAL missiles were

deployed in Cuba gave a good indication of the state of training of the forces engaged in this operation, it is not possible to determine from available intelligence the number of trained crews available for the weapons systems in the strategic rocket forces.

IRBM Organization



MRBM Organization



*Low figure reflects two hard launchers per site; upper figure reflects three.

**Low figure reflects three hard launchers per site; upper figure reflects four for the hard sites.

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